Claims

1   1.   (Currently Amended) A method for recovering from a failure in a

2   network, comprising:

3   sending a first set of information from a source to a destination via a first route;

4   detecting a failure along said first route;

5   in response to said failure, directing a message to said source informing said

6   source of said failure; and

7   in response to said message, sending a future set of information from said source

8   to said destination via an alternate route;

9   wherein directing said message to said source comprises:

10   identifying said source;

11   accessing a routing table which comprises one or more routes to said

12   source;

13   obtaining a return route from said routing table; and

14   sending said message to said source via said return route.

1   2.   (Original) The method of claim 1, further comprising:

2   in response to said message, preventing other sets of information from being sent

3   from said source to said destination via said first route.

1   3.   (Original) The method of claim 1, where said first set of information

2   comprises a data portion, and wherein said method further comprises:

3   in response to said message, resending at least said data portion of said first set of

4   information from said source to said destination via said alternate route.

1   4.   (Original) The method of claim 3, wherein said message comprises said

2   data portion such that said data portion is returned to said source.

1   5-6   Canceled

1   7.   (Currently Amended) The method of claim 6 1, wherein identifying said

2   source comprises:

3   extracting from said first set of information an identifier which identifies said

4   source.

1   8.   Canceled

1   9.   (Original) The method of claim 1, wherein said method is implemented

2   on a routing layer of said network.

1   10.   (Original) The method of claim 1, wherein said method is implemented

2   within a router of said network.

1   11.   (Currently Amended) A method, implemented within a router of a

2   network, for recovering from a failure, comprising:

3   sending a first set of information from an ingress module to an egress module via

4   a first route;

5   detecting a failure in said first route;

6   in response to said failure, directing a message to said ingress module informing

7   said ingress module of said failure; and

8   in response to said message, sending a future set of information from said ingress

9   module to said egress module via an alternate route;

10   wherein directing said message to said ingress module comprises:

11   identifying said ingress module;

12   accessing a routing table which comprises one or more routes to said

13   ingress module;

14   obtaining a return route from said routing table; and

15   sending said message to said ingress module via said return route.

1   12.   (Currently Amended) The method of claim 11, wherein said first route

2   and said alternate route are predetermined and stored within a second routing table.

1   13.   (Currently Amended) The method of claim 12, wherein sending said

2   future set of information comprises:

3   selecting said alternate route from said second routing table.

1   14.   (Original) The method of claim 11, further comprising:

2   in response to said message, preventing other sets of information from being sent

3   from said ingress module to said egress module via said first route.

1   15.   (Currently Amended) The method of claim 14, wherein said first route

2   and said alternate route are predetermined and stored within a <u>second</u> routing table, and

3   wherein preventing comprises:

4   replacing said first route with said alternate route in said <u>second</u> routing table.

1   16.   (Currently Amended) The method of claim 11, wherein said first set of

2   information comprises a data portion, and wherein said method further comprises:

3   in response to said message, resending at least said data portion of said first set of

4   information from said ingress module to said egress module via said alternate route for

5   forwarding to ~~said~~ <u>a</u> destination.

1   17.   (Original) The method of claim 16, wherein said message comprises said

2   data portion such that said data portion is returned to said ingress module.

1   18.   Canceled

1   19.   (Currently Amended) The method of claim ~~18~~ <u>11</u>, wherein identifying

2   said ingress module comprises:

3   extracting from said first set of information an identifier which identifies said

4   ingress module.

1   20.   (Original) The method of claim 11, wherein said ingress module

2   comprises an ingress line card, and said egress module comprises an egress line card.

1   21.   (Currently Amended) A method, implemented within a router of a

2   network, for recovering from a failure, comprising:

3   sending a first set of information from an ingress module to a first egress module

4   for forwarding by said first egress module to a destination external to said router;

5   detecting a failure of said first egress module;

6   in response to said failure of said first egress module, directing a message to said

7   ingress module informing said ingress module of said first egress module failure;

8   in response to said message, selecting an alternate egress module capable of

9   forwarding information to said destination; and

10   sending a future set of information from said ingress module to said alternate

11   egress module for forwarding to said destination;

12   wherein directing said message to said ingress module comprises:

13   identifying said ingress module;

14   accessing a routing table which comprises one or more routes to said

15   ingress module;

16   obtaining a return route from said routing table; and

17   sending said message to said ingress module via said return route.

1   22.   (Original) The method of claim 21, wherein said first set of information

2   and said future set of information are both part of a flow, and wherein said method

3   further comprises:

4   in response to said message, preventing other sets of information associated with

5   said flow from being sent from said ingress module to said first egress module.

1   23.   (Original) The method of claim 22, wherein said first egress module and

2   said alternate egress module are predetermined, wherein identifiers associated with said

3   first egress module and said alternate egress module are stored within a flow block

4   associated with said flow, and wherein preventing comprises:

5   storing an indication in said flow block that all sets of information associated with

6   said flow are not to be sent to said first egress module.

1   24.   (Currently Amended) The method of claim 21, wherein said first set of

2   information and said future set of information are both part of a flow, and wherein said

3   method further comprises:

4   in response to said message, causing said other sets of information associated with

5   said flow to be sent from said ingress module to said alternate egress module.

1   25.   (Original) The method of claim 24, wherein said first egress module and

2   said alternate egress module are predetermined, wherein identifiers associated with said

3   first egress module and said alternate egress module are stored within a flow block

4   associated with said flow, and wherein causing comprises:

5   storing an indication in said flow block that all sets of information associated with

6   said flow are to be sent to said alternate egress module.

1   26.   (Original) The method of claim 21, wherein said first set of information

2   and said future set of information are both part of a flow, wherein said first egress module

3   and said alternate egress module are predetermined, wherein identifiers associated with

4   said first egress module and said alternate egress module are stored within a flow block

5   associated with said flow, and wherein selecting said alternate egress module comprises:

6   accessing said flow block to access the identifier associated with said alternate

7   egress module.

1   27.   (Original) The method of claim 21, wherein said first set of information

2   comprises a data portion, and wherein said method further comprises:

3   in response to said message, resending at least said data portion of said first set of

4   information from said ingress module to said alternate egress module for forwarding to

5   said destination.

1   28.   (Original) The method of claim 27, wherein said message comprises said

2   data portion such that said data portion is returned to said ingress module.

1   29.   Canceled

1   30.   (Currently Amended) The method of claim ~~29~~ 21, wherein identifying

2   said ingress module comprises:

3   extracting from said first set of information an identifier which identifies said

4   ingress module.

1   31.   (Original) The method of claim 21, wherein said ingress module

2   comprises an ingress line card, said first egress module comprises a first egress line card,

3   and said alternate egress module comprises a second egress line card.

1   32.   (Original) The method of claim 21, wherein said method is implemented

2   on a routing layer of said network.

1   33.   (Currently Amended) A method, implemented within a router of a

2   network, for recovering from a failure, comprising:

3   sending a first set of information from an ingress module to a first egress module

4   for forwarding by said first egress module to a destination external to said router;

5   detecting an external failure beyond said first egress module;

6   in response to said external failure, directing a message to said ingress module

7   informing said ingress module of said external failure;

8   in response to said message, selecting an alternate egress module capable of

9   forwarding information to said destination; and

10   sending a future set of information from said ingress module to said alternate

11   egress module for forwarding to said destination;

12   wherein directing said message to said ingress module comprises:

13   identifying said ingress module;

14   accessing a routing table which comprises one or more routes to said

15   ingress module;

16   obtaining a return route from said routing table; and

17   sending said message to said ingress module via said return route.

1 34. (Original) The method of claim 33, wherein said first set of information

2 and said future set of information are both part of a flow, and wherein said method

3 further comprises:

4 in response to said message, preventing other sets of information associated with

5 said flow from being sent from said ingress module to said first egress module.

1 35. (Original) The method of claim 34, wherein said first egress module and

2 said alternate egress module are predetermined, wherein identifiers associated with said

3 first egress module and said alternate egress module are stored within a flow block

4 associated with said flow, and wherein preventing comprises:

5 storing an indication in said flow block that all sets of information associated with

6 said flow are not to be sent to said first egress module.

1 36. (Currently Amended) The method of claim 33, wherein said first set of

2 information and said future set of information are both part of a flow, and wherein said

3 method further comprises:

4   in response to said message, causing ~~said~~ other sets of information associated with

5   said flow to be sent from said ingress module to said alternate egress module.

1   37.   (Original) The method of claim 36, wherein said first egress module and

2   said alternate egress module are predetermined, wherein identifiers associated with said

3   first egress module and said alternate egress module are stored within a flow block

4   associated with said flow, and wherein causing comprises:

5   storing an indication in said flow block that all sets of information associated with

6   said flow are to be sent to said alternate egress module.

1   38.   (Original) The method of claim 33, wherein said first set of information

2   and said future set of information are both part of a flow, wherein said first egress module

3   and said alternate egress module are predetermined, wherein identifiers associated with

4   said first egress module and said alternate egress module are stored within a flow block

5   associated with said flow, and wherein selecting said alternate egress module comprises:

6   accessing said flow block to access the identifier associated with said alternate

7   egress module.

1   39.   (Original) The method of claim 33, wherein said first set of information

2   comprises a data portion, and wherein said method further comprises:

3   in response to said message, resending at least said data portion of said first set of

4   information from said ingress module to said alternate egress module for forwarding to

5   said destination.

1   40.   (Original) The method of claim 39, wherein said message comprises said

2   data portion such that said data portion is returned to said ingress module.

1   41.   Canceled

1   42.   (Currently Amended) The method of claim 41 33, wherein identifying

2   said ingress module comprises:

3   extracting from said first set of information an identifier which identifies said

4   ingress module.

1   43.   (Original) The method of claim 33, wherein said ingress module

2   comprises an ingress line card, said first egress module comprises a first egress line card,

3   and said alternate egress module comprises a second egress line card.

1   44.   (Original) The method of claim 33, wherein said method is implemented

2   on a routing layer of said network.

1   45.   (Original) The method of claim 33, wherein said external failure

2   precludes said first egress module from forwarding said first set of information to said

3   destination.

1   46.   (Currently Amended) A router, comprising:

2   an ingress module;

3   an egress module; and

4   a forwarding mechanism for forwarding information between said ingress module

5 and said egress module;

6   wherein said ingress module sends a first set of information to said forwarding

7 mechanism to be forwarded to said egress module via a first route, said forwarding

8 mechanism detecting a failure in said first route, and in response to said failure, said

9 forwarding mechanism directing a message to said ingress module informing said ingress

10 module of said failure, and in response to said message, said ingress module sending a

11 future set of information to said forwarding mechanism to be forwarded to said egress

12 module via an alternate route;

13   <u>wherein said forwarding mechanism directs said message to said ingress module</u>

14 <u>by:</u>

15   <u>identifying said ingress module;</u>

16   <u>accessing a routing table which comprises one or more routes to said</u>

17   <u>ingress module;</u>

18   <u>obtaining a return route from said routing table; and</u>

19   <u>sending said message to said ingress module via said return route.</u>

1   47.   (Currently Amended) The router of claim 46, wherein said ingress

2 module comprises a memory, and wherein said first route and said alternate route are

3 predetermined and stored within a <u>second</u> routing table in said memory.

1   48.   (Currently Amended) The router of claim 47, wherein said ingress

2   module selects said alternate route from said <u>second</u> routing table.

1   49.   (Original) The router of claim 46, wherein said ingress module, in

2   response to said message, prevents other sets of information from being sent from said

3   ingress module to said egress module via said first route.

1   50.   (Currently Amended) The router of claim 49, wherein said ingress

2   module comprises a memory, wherein said first route and said alternate route are

3   predetermined and stored within a <u>second</u> routing table in said memory, and wherein said

4   ingress module prevents other sets of information from being sent from said ingress

5   module to said egress module via said first route by replacing said first route with said

6   alternate route in said <u>second</u> routing table.

1   51.   (Original) The router of claim 46, wherein said first set of information

2   comprises a data portion, and wherein said ingress module, in response to said message,

3   resends at least said data portion of said first set of information to said forwarding

4   mechanism to be forwarded to said egress module via said alternate route.

1   52.   (Original) The router of claim 51, wherein said forwarding mechanism

2   includes said data portion in said message such that said data portion is returned by said

3   forwarding mechanism to said ingress module.

1   53.   Canceled

1   54.   (Currently Amended) The router of claim 53 46, wherein said forwarding

2   mechanism identifies said ingress module by extracting from said first set of information

3   an identifier which identifies said ingress module.

1   55.   (Original) The router of claim 46, wherein said ingress module comprises

2   an ingress line card, said egress module comprises an egress line card, and said

3   forwarding mechanism comprises a switching fabric.

1   56.   (Original) The router of claim 55, wherein said switching fabric

2   comprises a fabric card.

1   57.   (Currently Amended) A router, comprising:

2   an ingress module;

3   a first egress module;

4   an alternate egress module; and

5   a forwarding mechanism for forwarding information between said ingress

6   module, said first egress module, and said alternate egress module;

7   wherein said ingress module sends a first set of information to said forwarding

8   mechanism to be forwarded to said first egress module, said first set of information

9   intended to be forwarded by said first egress module to a destination external to said

10   router, said forwarding mechanism detecting a failure which precludes forwarding of said

11   first set of information to said first egress module, and in response to said failure, said

12   forwarding mechanism directing a message to said ingress module informing said ingress

13   module of said failure, and based upon said message, said ingress module determining

14   that said first egress module has failed, and in response to said message, said ingress

15   module selecting said alternate egress module and sending a future set of information to

16   said forwarding mechanism to be forwarded to said alternate egress module, said future

17   set of information intended to be forwarded by said alternate egress module to said

18   destination;

19   wherein said forwarding mechanism directs said message to said ingress module

20   by:

21   identifying said ingress module;

22   accessing a routing table which comprises one or more routes to said

23   ingress module;

24   obtaining a return route from said routing table; and

25   sending said message to said ingress module via said return route.

1   58.   (Original) The router of claim 57, wherein said first set of information

2   and said future set of information are both part of a flow, and wherein said ingress

3   module, in response to said message, prevents other sets of information associated with

4   said flow from being sent from said ingress module to said first egress module.

1   59.   (Original) The router of claim 58, wherein said first egress module and

2   said alternate egress module are predetermined, wherein said ingress module comprises a

3 memory, wherein identifiers associated with said first egress module and said alternate

4 egress module are stored within a flow block associated with said flow, said flow block

5 being stored in said memory, and wherein said ingress module prevents other sets of

6 information associated with said flow from being sent from said ingress module to said

7 first egress module by storing an indication in said flow block that all sets of information

8 associated with said flow are not to be sent to said first egress module.

1   60.   (Currently Amended) The router of claim 57, wherein said first set of

2 information and said future set of information are both part of a flow, and wherein said

3 ingress module, in response to said message, causes ~~said~~ other sets of information

4 associated with said flow to be sent from said ingress module to said alternate egress

5 module via said forwarding mechanism.

1   61.   (Currently Amended) The router of claim 60, wherein said first egress

2 module and said alternate egress module are predetermined, wherein said ingress module

3 comprises a memory, wherein identifiers associated with said first egress module and

4 said alternate egress module are stored within a flow block associated with said flow, said

5 flow block being stored in said memory, and wherein said ingress module causes ~~said~~

6 other sets of information associated with said flow to be sent from said ingress module to

7 said alternate egress module by storing an indication in said flow block that all sets of

8 information associated with said flow are to be sent to said alternate egress module.

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1   62.   (Original) The router of claim 57, wherein said first set of information

2   and said future set of information are both part of a flow, wherein said first egress module

3   and said alternate egress module are predetermined, wherein said ingress module

4   comprises a memory, wherein identifiers associated with said first egress module and

5   said alternate egress module are stored within a flow block associated with said flow, said

6   flow block being stored in said memory, and wherein said ingress module selects said

7   alternate egress module by accessing said flow block to access the identifier associated

8   with said alternate egress module.

1   63.   (Original) The router of claim 57, wherein said first set of information

2   comprises a data portion, and wherein said ingress module, in response to said message,

3   resends at least said data portion of said first set of information to said forwarding

4   mechanism to be forwarded to said alternate egress module for forwarding to said

5   destination.

1   64.   (Original) The router of claim 63, wherein said forwarding mechanism

2   includes said data portion in said message such that said data portion is returned by said

3   forwarding mechanism to said ingress module.

1   65.   Canceled

1   66.   (Currently Amended) The router of claim 65 57, wherein said forwarding

2   mechanism identifies said ingress module by extracting from said first set of information

3   an identifier which identifies said ingress module.

1   67.   (Original) The router of claim 57, wherein said ingress module comprises

2   an ingress line card, said first egress module comprises a first egress line card, said

3   alternate egress module comprises a second egress line card, and said forwarding

4   mechanism comprises a switching fabric.

1   68.   (Original) The router of claim 67, wherein said switching fabric

2   comprises a fabric card.

1   69.   (Currently Amended) A router, comprising:

2   an ingress module;

3   a first egress module;

4   an alternate egress module; and

5   a forwarding mechanism for forwarding information between said ingress

6   module, said first egress module, and said alternate egress module;

7   wherein said ingress module sends a first set of information to said forwarding

8   mechanism to be forwarded to said first egress module, said first set of information

9   intended to be forwarded by said first egress module to a destination external to said

10   router, said first egress module detecting an external failure which precludes said first

11   egress module from forwarding said first set of information to said destination, and in

12   response to said external failure, said first egress module directing a message to said

13   ingress module informing said ingress module of said external failure, and in response to

14   said message, said ingress module selecting said alternate egress module and sending a

15   future set of information to said forwarding mechanism to be forwarded to said alternate

16   egress module, said future set of information intended to be forwarded by said alternate

17   egress module to said destination;

18   wherein said first egress module directs said message to said ingress module by:

19   identifying said ingress module;

20   accessing a routing table which comprises one or more routes to said

21   ingress module;

22   obtaining a return route from said routing table; and

23   sending said message to said ingress module via said return route.

1   70.   (Original) The router of claim 69, wherein said first set of information

2   and said future set of information are both part of a flow, and wherein said ingress

3   module, in response to said message, prevents other sets of information associated with

4   said flow from being sent from said ingress module to said first egress module.

1   71.   (Original) The router of claim 70, wherein said first egress module and

2   said alternate egress module are predetermined, wherein said ingress module comprises a

3   memory, wherein identifiers associated with said first egress module and said alternate

4   egress module are stored within a flow block associated with said flow, said flow block

5   being stored in said memory, and wherein said ingress module prevents other sets of

6   information associated with said flow from being sent from said ingress module to said

7   first egress module by storing an indication in said flow block that all sets of information

8   associated with said flow are not to be sent to said first egress module.

1   72.   (Currently Amended) The router of claim 69, wherein said first set of

2   information and said future set of information are both part of a flow, and wherein said

3   ingress module, in response to said message, causes said other sets of information

4   associated with said flow to be sent from said ingress module to said alternate egress

5   module via said forwarding mechanism.

1   73.   (Currently Amended) The router of claim 72, wherein said first egress

2   module and said alternate egress module are predetermined, wherein said ingress module

3   comprises a memory, wherein identifiers associated with said first egress module and

4   said alternate egress module are stored within a flow block associated with said flow, said

5   flow block being stored in said memory, and wherein said ingress module causes said

6   other sets of information associated with said flow to be sent from said ingress module to

7   said alternate egress module by storing an indication in said flow block that all sets of

8   information associated with said flow are to be sent to said alternate egress module.

1   74.   (Original) The router of claim 69, wherein said first set of information

2   and said future set of information are both part of a flow, wherein said first egress module

3   and said alternate egress module are predetermined, wherein said ingress module

4   comprises a memory, wherein identifiers associated with said first egress module and

5   said alternate egress module are stored within a flow block associated with said flow, said

6   flow block being stored in said memory, and wherein said ingress module selects said

7   alternate egress module by accessing said flow block to access the identifier associated

8   with said alternate egress module.

1   75.   (Original) The router of claim 69, wherein said first set of information

2   comprises a data portion, and wherein said ingress module, in response to said message,

3   resends at least said data portion of said first set of information to said forwarding

4   mechanism to be forwarded to said alternate egress module for forwarding to said

5   destination.

1   76.   (Original) The router of claim 75, wherein said first egress module

2   includes said data portion in said message such that said data portion is returned by said

3   first egress module to said ingress module.

1   77.   Canceled

1   78.   (Currently Amended) The router of claim 77 69, wherein said first egress

2   module identifies said ingress module by extracting from said first set of information an

3   identifier which identifies said ingress module.

1   79.   (Original) The router of claim 69, wherein said ingress module comprises

2   an ingress line card, said first egress module comprises a first egress line card, said

3   alternate egress module comprises a second egress line card, and said forwarding

4   mechanism comprises a switching fabric.

1   80.   (Original) The router of claim 79, wherein said switching fabric

2   comprises a fabric card.

1   81.   (Currently Amended) A method implemented by a forwarding

2   mechanism in a router, comprising:

3   receiving a set of information sent by an ingress module intended to be forwarded

4   to an egress module via a particular route;

5   detecting a failure in said particular route; and

6   in response to said failure, directing a message to said ingress module informing

7   said ingress module of said failure;

8   wherein directing said message to said ingress module comprises:

9   identifying said ingress module;

10   accessing a routing table which comprises one or more routes to said

11   ingress module;

12   obtaining a return route from said routing table; and

13   sending said message to said ingress module via said return route.

1   82.   (Original) The method of claim 81, wherein said set of information

2   comprises a data portion, and wherein directing said message to said ingress module

3   comprises:

4   returning said data portion to said ingress module.

1   83.   (Original) The method of claim 81, wherein said set of information

2 comprises a data portion, and wherein directing said message to said ingress module

3 comprises:

4   including said data portion in said message such that said data portion is returned

5 to said ingress module.

1   84.   Canceled

1   85.   (Currently Amended) The method of claim 84 81, wherein identifying

2 said ingress module comprises:

3   extracting from said first set of information an identifier which identifies said

4 ingress module.

1   86.   Canceled

1   87.   (Currently Amended) A forwarding mechanism in a router, comprising:

2   a mechanism for receiving a set of information sent by an ingress module

3 intended to be forwarded to an egress module via a particular route;

4   a mechanism for detecting a failure in said particular route; and

5   a mechanism for directing, in response to said failure, a message to said ingress

6 module informing said ingress module of said failure;

7   wherein said forwarding mechanism further comprises a memory for storing a

8   routing table which comprises one or more routes to said ingress module, and wherein the

9   mechanism for directing said message to said ingress module comprises:

10   a mechanism for identifying said ingress module;

11   a mechanism for accessing said routing table;

12   a mechanism for obtaining a return route from said routing table; and

13   a mechanism for sending said message to said ingress module via said

14   return route.

1   88.   (Original) The forwarding mechanism of claim 87, wherein said set of

2   information comprises a data portion, and wherein the mechanism for directing said

3   message to said ingress module comprises:

4   a mechanism for returning said data portion to said ingress module.

1   89.   (Original) The forwarding mechanism of claim 87, wherein said set of

2   information comprises a data portion, and wherein the mechanism for directing said

3   message to said ingress module comprises:

4   a mechanism for including said data portion in said message such that said data

5   portion is returned to said ingress module.

1   90.   Canceled

1   91.   (Currently Amended) The forwarding mechanism of claim 90 87, wherein

2   the mechanism for identifying said ingress module comprises:

3   a mechanism for extracting from said first set of information an identifier which

4   identifies said ingress module.

1   92.   Canceled

1   93.   (Currently Amended) A method implemented by an egress module in a

2   router, comprising:

3   receiving a set of information sent by an ingress module intended to be forwarded

4   by the egress module to a destination external to the router;

5   detecting a failure external to the router which precludes the egress module from

6   forwarding said set of information to said destination; and

7   in response to said failure, directing a message to said ingress module informing

8   said ingress module of said failure;

9   wherein directing said message to said ingress module comprises:

10   identifying said ingress module;

11   accessing a routing table which comprises one or more routes to said

12   ingress module;

13   obtaining a return route from said routing table; and

14   sending said message to said ingress module via said return route.

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1   94.   (Original) The method of claim 93, wherein said set of information

2   comprises a data portion, and wherein directing said message to said ingress module

3   comprises:

4   returning said data portion to said ingress module.

1   95.   (Original) The method of claim 93, wherein said set of information

2   comprises a data portion, and wherein directing said message to said ingress module

3   comprises:

4   including said data portion in said message such that said data portion is returned

5   to said ingress module.

1   96.   Canceled

1   97.   (Currently Amended) The method of claim ~~96~~ 93, wherein identifying

2   said ingress module comprises:

3   extracting from said first set of information an identifier which identifies said

4   ingress module.

1   98.   Canceled

1   99.   (Currently Amended) An egress module in a router, comprising:

2   a mechanism for receiving a set of information sent by an ingress module

3   intended to be forwarded by said egress module to a destination external to the router;

4   a mechanism for detecting a failure external to the router which precludes said

5   egress module from forwarding said set of information to said destination; and

6   a mechanism for directing, in response to said failure, a message to said ingress

7   module informing said ingress module of said failure;

8   wherein said egress module further comprises a memory for storing a routing

9   table which comprises one or more routes to said ingress module, and wherein the

10   mechanism for directing said message to said ingress module comprises:

11   a mechanism for identifying said ingress module;

12   a mechanism for accessing said routing table;

13   a mechanism for obtaining a return route from said routing table; and

14   a mechanism for sending said message to said ingress module via said

15   return route.

1   100.   (Original) The egress module of claim 99, wherein said set of information

2   comprises a data portion, and wherein the mechanism for directing said message to said

3   ingress module comprises:

4   a mechanism for returning said data portion to said ingress module.

1   101.   (Original) The egress module of claim 99, wherein said set of information

2   comprises a data portion, and wherein the mechanism for directing said message to said

3   ingress module comprises:

4   a mechanism for including said data portion in said message such that said data

5   portion is returned to said ingress module.

1   102.   Canceled

1   103.   (Currently Amended) The egress module of claim ~~102~~ 99, wherein the

2   mechanism for identifying said ingress module comprises:

3   a mechanism for extracting from said first set of information an identifier which

4   identifies said ingress module.

1   104.   Canceled

1   105.   (Currently Amended) A method implemented by an ingress module in a

2   router, comprising:

3   sending a first set of information to an egress module via a first route, said first set

4   of information intended to be forwarded by the egress module to a destination external to

5   the router;

6   receiving a message indicating that said first set of information did not reach the

7   destination successfully;

8   determining based upon said message whether future sets of information should

9   be sent to the egress module; and

10   in response to a determination that future sets of information should be sent to the

11   egress module, sending a future set of information to the egress module via an alternate

12   route;

13   wherein it is determined that future sets of information should be sent to the

14   egress module if: (a) said message does not indicate that the egress module has failed;

15   and (2) said message does not indicate that an external failure, which would preclude the

16   egress module from forwarding said first set of information to the destination, has

17   occurred.

1   106.   Canceled

1   107.   (Original) The method of claim 105, wherein said first route and said

2   alternate route are predetermined and stored within a routing table, and wherein sending

3   said future set of information to the egress module comprises:

4   selecting said alternate route from said routing table.

1   108.   (Original) The method of claim 105, further comprising:

2   in response to a determination that future sets of information should be sent to the

3   egress module, preventing said future sets of information from being sent to the egress

4   module via said first route.

1   109.   (Original) The method of claim 108, wherein said first route and said

2   alternate route are predetermined and stored within a routing table, and wherein

3   preventing comprises:

4   replacing said first route with said alternate route in said routing table.

1   110.   (Original) The method of claim 105, wherein said first set of information

2   comprises a data portion, and wherein said method further comprises:

3   in response to a determination that future sets of information should be sent to the

4   egress module, resending at least said data portion of said first set of information to the

5   egress module via said alternate route.

1   111.   (Original) The method of claim 110, wherein said message indicating that

2   said first set of information did not reach the destination successfully comprises said data

3   portion of said first set of information.

1   112.   (Currently Amended) A method implemented by an ingress module in a

2   router, comprising:

3   sending a first set of information to a first egress module, said first set of

4   information intended to be forwarded by the first egress module to a destination external

5   to the router;

6   receiving a message indicating that said first set of information did not reach the

7   destination successfully;

8   determining based upon said message whether future sets of information should

9   be sent to the first egress module; ~~and~~

10   in response to a determination that future sets of information should not be sent to

11   the first egress module, selecting an alternate egress module capable of forwarding

12   information to the destination; and

13   sending a future set of information to the alternate egress module to be forwarded

14   by the alternate egress module to the destination;

15   wherein it is determined that future sets of information should not be sent to the

16   first egress module if: (a) said message indicates that the first egress module has failed;

17   or (2) said message indicates that an external failure, which would preclude the first

18   egress module from forwarding said first set of information to the destination, has

19   occurred.

1   113.   Canceled

1   114.   (Original) The method of claim 112, wherein said first set of information

2   and said future set of information are both part of a flow, and wherein said method

3   further comprises:

4   in response to a determination that future sets of information should not be sent to

5   the first egress module, preventing other sets of information associated with said flow

6   from being sent to the first egress module.

1   115.   (Original) The method of claim 114, wherein said first egress module and

2   said alternate egress module are predetermined, wherein identifiers associated with said

3   first egress module and said alternate egress module are stored within a flow block

4   associated with said flow, and wherein preventing comprises:

5   storing an indication in said flow block that all sets of information associated with

6   said flow are not to be sent to the first egress module.

1 116. (Original) The method of claim 112, wherein said first set of information

2 and said future set of information are both part of a flow, and wherein said method

3 further comprises:

4   in response to a determination that future sets of information should not be sent to

5 the first egress module, causing other sets of information associated with said flow to be

6 sent to the alternate egress module.

1 117. (Original) The method of claim 116, wherein said first egress module and

2 said alternate egress module are predetermined, wherein identifiers associated with said

3 first egress module and said alternate egress module are stored within a flow block

4 associated with said flow, and wherein causing comprises:

5   storing an indication in said flow block that all sets of information associated with

6 said flow are to be sent to the alternate egress module.

1 118. (Original) The method of claim 112, wherein said first set of information

2 and said future set of information are both part of a flow, wherein said first egress module

3 and said alternate egress module are predetermined, wherein identifiers associated with

4 said first egress module and said alternate egress module are stored within a flow block

5 associated with said flow, and wherein selecting the alternate egress module comprises:

6   accessing said flow block to access the identifier associated with the alternate

7 egress module.

1   119.   (Original) The method of claim 112, wherein said first set of information

2   comprises a data portion, and wherein said method further comprises:

3   in response to a determination that future sets of information should not be sent to

4   the first egress module, resending at least said data portion of said first set of information

5   to the alternate egress module to be forwarded by the alternate egress module to the

6   destination.

1   120.   (Original) The method of claim 119, wherein said message indicating that

2   said first set of information did not reach the destination successfully comprises said data

3   portion of said first set of information.

1   121.   (Currently Amended) An ingress module in a router, comprising:

2   a mechanism for sending a first set of information to an egress module via a first

3   route, said first set of information intended to be forwarded by the egress module to a

4   destination external to the router;

5   a mechanism for receiving a message indicating that said first set of information

6   did not reach the destination successfully;

7   a mechanism for determining based upon said message whether future sets of

8   information should be sent to the egress module; and

9   a mechanism for sending, in response to a determination that future sets of

10   information should be sent to the egress module, a future set of information to the egress

11   module via an alternate route;

12   wherein it is determined that future sets of information should be sent to the

13   egress module if: (a) said message does not indicate that the egress module has failed;

14   and (2) said message does not indicate that an external failure, which would preclude the

15   egress module from forwarding said first set of information to the destination, has

16   occurred.

1   122.   Canceled

1   123.   (Original) The ingress module of claim 121, wherein said ingress module

2   comprises a memory, wherein said first route and said alternate route are predetermined

3   and stored within a routing table in said memory, and wherein the mechanism for sending

4   said future set of information to the egress module comprises:

5   a mechanism for selecting said alternate route from said routing table.

1   124.   (Original) The ingress module of claim 121, further comprising:

2   a mechanism for preventing, in response to a determination that future sets of

3   information should be sent to the egress module, said future sets of information from

4   being sent to the egress module via said first route.

1   125.   (Original) The ingress module of claim 124, wherein said ingress module

2   comprises a memory, wherein said first route and said alternate route are predetermined

3   and stored within a routing table in said memory, and wherein the mechanism for

4   preventing comprises:

5   a mechanism for replacing said first route with said alternate route in said routing

6   table.

1   126.   (Original) The ingress module of claim 121, wherein said first set of

2   information comprises a data portion, and wherein said ingress module further comprises:

3   a mechanism for resending, in response to a determination that future sets of

4   information should be sent to the egress module, at least said data portion of said first set

5   of information to the egress module via said alternate route.

1   127.   (Original) The ingress module of claim 126, wherein said message

2   indicating that said first set of information did not reach the destination successfully

3   comprises said data portion of said first set of information.

1   128.   (Currently Amended) An ingress module in a router, comprising:

2   a mechanism for sending a first set of information to a first egress module, said

3   first set of information intended to be forwarded by the first egress module to a

4   destination external to the router;

5   a mechanism for receiving a message indicating that said first set of information

6   did not reach the destination successfully;

7   a mechanism for determining based upon said message whether future sets of

8   information should be sent to the first egress module; and

9   a mechanism for selecting, in response to a determination that future sets of

10   information should not be sent to the first egress module, an alternate egress module

11   capable of forwarding information to the destination; and

12   a mechanism for sending a future set of information to the alternate egress module

13   to be forwarded by the alternate egress module to the destination;

14   wherein it is determined that future sets of information should not be sent to the

15   egress module if: (a) said message indicates that the first egress module has failed; or (2)

16   said message indicates that an external failure, which would preclude the first egress

17   module from forwarding said first set of information to the destination, has occurred.

1   129.   Canceled

1   130.   (Original) The ingress module of claim 128, wherein said first set of

2   information and said future set of information are both part of a flow, and wherein said

3   ingress module further comprises:

4   a mechanism for preventing, in response to a determination that future sets of

5   information should not be sent to the first egress module, other sets of information

6   associated with said flow from being sent to the first egress module.

1   131.   (Original) The ingress module of claim 130, wherein said ingress module

2   comprises a memory, wherein the first egress module and the alternate egress module are

3   predetermined, wherein identifiers associated with the first egress module and the

4   alternate egress module are stored within a flow block associated with said flow, said

5   flow block being stored in said memory, and wherein the mechanism for preventing

6   comprises:

7   a mechanism for storing an indication in said flow block that all sets of

8   information associated with said flow are not to be sent to the first egress module.

1   132.   (Original) The ingress module of claim 128, wherein said first set of

2   information and said future set of information are both part of a flow, and wherein said

3   ingress module further comprises:

4   a mechanism for causing, in response to a determination that future sets of

5   information should not be sent to the first egress module, other sets of information

6   associated with said flow to be sent to the alternate egress module.

1   133.   (Original) The ingress module of claim 132, wherein said ingress module

2   comprises a memory, wherein the said first egress module and the alternate egress

3   module are predetermined, wherein identifiers associated with the first egress module and

4   the alternate egress module are stored within a flow block associated with said flow, said

5   flow block being stored in said memory, and wherein the mechanism for causing

6   comprises:

7   a mechanism for storing an indication in said flow block that all sets of

8   information associated with said flow are to be sent to the alternate egress module.

1   134.   (Original) The ingress module of claim 128, wherein said ingress module

2   comprises a memory, wherein said first set of information and said future set of

3   information are both part of a flow, wherein the first egress module and the alternate

4   egress module are predetermined, wherein identifiers associated with the first egress

5   module and the alternate egress module are stored within a flow block associated with

6   said flow, said flow block being stored in said memory, and wherein the mechanism for

7   selecting the alternate egress module comprises:

8   a mechanism for accessing said flow block to access the identifier associated with

9   the alternate egress module.

1   135.   (Original) The ingress module of claim 128, wherein said first set of

2   information comprises a data portion, and wherein said ingress module further comprises:

3   a mechanism for resending, in response to a determination that future sets of

4   information should not be sent to the first egress module, at least said data portion of said

5   first set of information to the alternate egress module to be forwarded by the alternate

6   egress module to the destination.

1   136.   (Original) The ingress module of claim 135, wherein said message

2   indicating that said first set of information did not reach the destination successfully

3   comprises said data portion of said first set of information.

1   137.   (New) A method, implemented within a router of a network, for

2   recovering from a failure, comprising:

3   sending a first set of information from an ingress module to a first egress module

4   for forwarding by said first egress module to a destination external to said router;

5   detecting a failure of said first egress module;

6   in response to said failure of said first egress module, directing a message to said

7   ingress module informing said ingress module of said first egress module failure;

8   in response to said message, selecting an alternate egress module capable of

9   forwarding information to said destination; and

10   sending a future set of information from said ingress module to said alternate

11   egress module for forwarding to said destination;

12   wherein said first set of information and said future set of information are both

13   part of a flow, wherein said first egress module and said alternate egress module are

14   predetermined, wherein identifiers associated with said first egress module and said

15   alternate egress module are stored within a flow block associated with said flow, and

16   wherein selecting said alternate egress module comprises:

17   accessing said flow block to access the identifier associated with said alternate

18   egress module.

1   138.   (New) The method of claim 137, further comprising:

2   in response to said message, preventing other sets of information associated with

3   said flow from being sent from said ingress module to said first egress module by storing

4   an indication in said flow block that all sets of information associated with said flow are

5   not to be sent to said first egress module.

1   139.   (New) The method of claim 137, further comprising:

2   in response to said message, causing other sets of information associated with said

3   flow to be sent from said ingress module to said alternate egress module by storing an

4   indication in said flow block that all sets of information associated with said flow are to

5   be sent to said alternate egress module.

1   140.   (New) A method, implemented within a router of a network, for

2   recovering from a failure, comprising:

3   sending a first set of information from an ingress module to a first egress module

4   for forwarding by said first egress module to a destination external to said router;

5   detecting an external failure beyond said first egress module;

6   in response to said external failure, directing a message to said ingress module

7   informing said ingress module of said external failure;

8   in response to said message, selecting an alternate egress module capable of

9   forwarding information to said destination; and

10   sending a future set of information from said ingress module to said alternate

11   egress module for forwarding to said destination;

12   wherein said first set of information and said future set of information are both

13   part of a flow, wherein said first egress module and said alternate egress module are

14   predetermined, wherein identifiers associated with said first egress module and said

15   alternate egress module are stored within a flow block associated with said flow, and

16   wherein selecting said alternate egress module comprises:

17   accessing said flow block to access the identifier associated with said alternate

18   egress module.

1   141.   (New) The method of claim 140, further comprising:

2   in response to said message, preventing other sets of information associated with

3   said flow from being sent from said ingress module to said first egress module by storing

4   an indication in said flow block that all sets of information associated with said flow are

5   not to be sent to said first egress module.

1   142.   (New) The method of claim 140, further comprising:

2   in response to said message, causing other sets of information associated with said

3   flow to be sent from said ingress module to said alternate egress module by storing an

4   indication in said flow block that all sets of information associated with said flow are to

5   be sent to said alternate egress module.

1   143.   (New) A router, comprising:

2   an ingress module;

3   a first egress module;

4   an alternate egress module; and

5   a forwarding mechanism for forwarding information between said ingress

6   module, said first egress module, and said alternate egress module;

7   wherein said ingress module sends a first set of information to said forwarding

8   mechanism to be forwarded to said first egress module, said first set of information

9   intended to be forwarded by said first egress module to a destination external to said

10   router, said forwarding mechanism detecting a failure which precludes forwarding of said

11   first set of information to said first egress module, and in response to said failure, said

12   forwarding mechanism directing a message to said ingress module informing said ingress

13   module of said failure, and based upon said message, said ingress module determining

14   that said first egress module has failed, and in response to said message, said ingress

15   module selecting said alternate egress module and sending a future set of information to

16   said forwarding mechanism to be forwarded to said alternate egress module, said future

17   set of information intended to be forwarded by said alternate egress module to said

18   destination;

19   wherein said first set of information and said future set of information are both

20   part of a flow, wherein said first egress module and said alternate egress module are

21   predetermined, wherein said ingress module comprises a memory, wherein identifiers

22   associated with said first egress module and said alternate egress module are stored

23   within a flow block associated with said flow, said flow block being stored in said

24   memory, and wherein said ingress module selects said alternate egress module by

25   accessing said flow block to access the identifier associated with said alternate egress

26   module.

1   144.   (New) The router of claim 143, wherein said ingress module, in response

2   to said message, prevents other sets of information associated with said flow from being

3   sent from said ingress module to said first egress module by storing an indication in said

4   flow block that all sets of information associated with said flow are not to be sent to said

5   first egress module.

1   145.   (New) The router of claim 143, wherein said ingress module, in response

2   to said message, causes other sets of information associated with said flow to be sent

3   from said ingress module to said alternate egress module by storing an indication in said

4   flow block that all sets of information associated with said flow are to be sent to said

5   alternate egress module.

1   146.   (New) A router, comprising:

2   an ingress module;

3   a first egress module;

4   an alternate egress module; and

5   a forwarding mechanism for forwarding information between said ingress

6   module, said first egress module, and said alternate egress module;

7   wherein said ingress module sends a first set of information to said forwarding

8   mechanism to be forwarded to said first egress module, said first set of information

9   intended to be forwarded by said first egress module to a destination external to said

10   router, said first egress module detecting an external failure which precludes said first

11   egress module from forwarding said first set of information to said destination, and in

12   response to said external failure, said first egress module directing a message to said

13   ingress module informing said ingress module of said external failure, and in response to

14   said message, said ingress module selecting said alternate egress module and sending a

15   future set of information to said forwarding mechanism to be forwarded to said alternate

16   egress module, said future set of information intended to be forwarded by said alternate

17   egress module to said destination;

18   wherein said first set of information and said future set of information are both

19   part of a flow, wherein said first egress module and said alternate egress module are

20   predetermined, wherein said ingress module comprises a memory, wherein identifiers

21   associated with said first egress module and said alternate egress module are stored

22   within a flow block associated with said flow, said flow block being stored in said

23   memory, and wherein said ingress module selects said alternate egress module by

24   accessing said flow block to access the identifier associated with said alternate egress

25   module.

1   147.   (New) The router of claim 146, wherein said ingress module, in response

2   to said message, prevents other sets of information associated with said flow from being

3   sent from said ingress module to said first egress module by storing an indication in said

4   flow block that all sets of information associated with said flow are not to be sent to said

5   first egress module.

1   148.   (New) The router of claim 146, wherein said ingress module, in response

2   to said message, causes other sets of information associated with said flow to be sent

3   from said ingress module to said alternate egress module by storing an indication in said

4   flow block that all sets of information associated with said flow are to be sent to said

5   alternate egress module.

1   149.   (New) A method implemented by an ingress module in a router,

2   comprising:

3   sending a first set of information to a first egress module, said first set of

4   information intended to be forwarded by the first egress module to a destination external

5   to the router;

6   receiving a message indicating that said first set of information did not reach the

7   destination successfully;

8   determining based upon said message whether future sets of information should

9   be sent to the first egress module;

10   in response to a determination that future sets of information should not be sent to

11   the first egress module, selecting an alternate egress module capable of forwarding

12   information to the destination; and

13   sending a future set of information to the alternate egress module to be forwarded

14   by the alternate egress module to the destination;

15   wherein said first set of information and said future set of information are both

16   part of a flow, wherein said first egress module and said alternate egress module are

17   predetermined, wherein identifiers associated with said first egress module and said

18   alternate egress module are stored within a flow block associated with said flow, and

19   wherein selecting the alternate egress module comprises:

20   accessing said flow block to access the identifier associated with the alternate

21   egress module.

1   150.   (New) The method of claim 149, further comprising:

2   in response to a determination that future sets of information should not be sent to

3   the first egress module, preventing other sets of information associated with said flow

4   from being sent to the first egress module by storing an indication in said flow block that

5   all sets of information associated with said flow are not to be sent to the first egress

6   module.

1   151.   (New) The method of claim 149, further comprising:

2   in response to a determination that future sets of information should not be sent to

3   the first egress module, causing other sets of information associated with said flow to be

4   sent to the alternate egress module by storing an indication in said flow block that all sets

5   of information associated with said flow are to be sent to the alternate egress module.

1   152.   (New) An ingress module in a router, comprising:

2   a mechanism for sending a first set of information to a first egress module, said

3   first set of information intended to be forwarded by the first egress module to a

4   destination external to the router;

5   a mechanism for receiving a message indicating that said first set of information

6   did not reach the destination successfully;

7   a mechanism for determining based upon said message whether future sets of

8   information should be sent to the first egress module;

9   a mechanism for selecting, in response to a determination that future sets of

10   information should not be sent to the first egress module, an alternate egress module

11   capable of forwarding information to the destination; and

12   a mechanism for sending a future set of information to the alternate egress module

13   to be forwarded by the alternate egress module to the destination;

14   wherein said ingress module comprises a memory, wherein said first set of

15   information and said future set of information are both part of a flow, wherein the first

16   egress module and the alternate egress module are predetermined, wherein identifiers

17   associated with the first egress module and the alternate egress module are stored within a

18   flow block associated with said flow, said flow block being stored in said memory, and

19   wherein the mechanism for selecting the alternate egress module comprises:

20   a mechanism for accessing said flow block to access the identifier associated with

21   the alternate egress module.

1   153.   (New) The ingress module of claim 152, further comprising:

2   a mechanism for preventing, in response to a determination that future sets of

3   information should not be sent to the first egress module, other sets of information

4   associated with said flow from being sent to the first egress module, the mechanism for

5   preventing comprising a mechanism for storing an indication in said flow block that all

6   sets of information associated with said flow are not to be sent to the first egress module.

1   154.   (New) The ingress module of claim 152, further comprising:

2   a mechanism for causing, in response to a determination that future sets of

3   information should not be sent to the first egress module, other sets of information

4   associated with said flow to be sent to the alternate egress module, the mechanism for

5   causing comprising a mechanism for storing an indication in said flow block that all sets

6   of information associated with said flow are to be sent to the alternate egress module.